

Amendment dated February 3, 2006
First Preliminary Amendment

AMENDMENTS TO THE SPECIFICATION

Please amend the title as follows:

SYSTEM HAVING DLC CONTACT SURFACES, METHOD OF LUBRICATING THE SYSTEM, AND LUBRICANT FOR THE SYSTEM

Please replace the paragraph beginning on page 15, line 20, with the following rewritten paragraph:

-- Thus, in order to further improve such effects, and for improving detergency, it is preferred to add component (B) as required. The content of component (B), if any, is not particularly limited. For use in internal combustion engines, the content in terms of metal elements, is preferably 0.01 to 1 wt mass%, more preferably 0.05 to 0.3 wt mass% of the total amount of the lubricant, and most preferably not more than 0.2 wt mass% for lowering sulfated ash. --

Please replace the paragraph beginning on page 20, line 25, with the following rewritten paragraph:

-- It is believed that component (C) in the lubricant of the present invention inhibits degradation of lubricating conditions due to deterioration products generated by lubricant deterioration, prevents increase in friction, and maintains the low friction property of the lubricant more advantageously. Thus, for further improving such effects, and for improving the anti-wear property, it is preferred to contain component (C) as desired. The content of component (C) is not particularly limited, and is usually 0.1 to 5 wt mass% of the total amount of the lubricant. When the lubricant of the present invention is to be used in an internal combustion engine, the content of component (C) is preferably 0.01 to 0.1 wt mass%, preferably not more than 0.08 mass%, most

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preferably not more than 0.06 mass% of the total amount of the lubricant in terms of phosphorus elements, in view of the impact on exhaust gas post-treatment systems. --

Please replace the paragraph beginning on page 23, line 1, with the following rewritten paragraph:

-- It is believed that component (D) inhibits degradation of lubricating conditions due to sludge or the like generated by lubricant deterioration, and prevents increase in friction, so that component (D) improves sustainability of the friction reducing effect of the lubricant. Thus, for further improving such effects, and for improving oxidation stability, it is preferred to contain component (D) as desired. The content of component (D), if any, is usually 0.01 to 5 ~~wt~~ mass%, preferably 0.1 to 3 ~~wt~~ mass%, more preferably 0.5 to 2 ~~wt~~ mass% of the total amount of the lubricant. --

Please replace the paragraph beginning on page 23, line 22, with the following rewritten paragraph:

-- The oxygen-containing organic compound may be any organic compound as long as it has oxygen in its molecule, and may be a compound composed of carbon, ~~oxygen~~ hydrogen, and oxygen, or a compound having, in addition to these elements, halogen, such as fluorine or chlorine, nitrogen, sulfur, phosphorus, boron, metal, or the like, in its molecule. --

Please replace the paragraph beginning on page 24, line 22, with the following rewritten paragraph:

-- The above-mentioned derivatives may typically be a compound obtained by reacting the compound composed of carbon, ~~oxygen~~ hydrogen, and oxygen, with, for example, a nitrogen-containing compound, a phosphorus-containing compound, sulfur, a sulfur containing compound, a

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boron-containing compound, halogen, a halogen-containing compound, metal, an inorganic or organic metal-containing compound, or alkylene oxide. --

Please replace the paragraph beginning on page 25, line 25, with the following rewritten paragraph:

-- Examples of the monohydric alkyl alcohols may include methanol; ethanol; propanol, such as 1-propanol and 2-propanol; butanol, such as 1-butanol, 2-butanol, 2-methyl-1-propanol, and 2-methyl-2-propanol; pentanol, such as 1-pentanol, 2-pentanol, 3-pentanol, 2-methyl-1-butanol, 3-methyl-1-butanol, 3-methyl-2-butanol, 2-methyl-2-butanol, and 2,2-dimethyl-1-propanol; hexanol, such as 1-hexanol, 2-hexanol, 3-hexanol, 2-methyl-1-pentanol, 2-methyl-2-pentanol, 2-methyl-3-pentanol, 3-methyl-1-pentanol, 3-methyl-2-pentanol, 3-methyl-3-pentanol, 4-methyl-1-pentanol, 4-methyl-1-pentanol, 4-methyl-2-pentanol, 2,3-dimethyl-2-butanol, 3,3-dimethyl-1-butanol, 3,3-dimethyl-2-butanol, 2-ethyl-1-butanol, and 2,2-dimethylbutanol; heptanol, such as 1-heptanol, 2-heptanol, 3-heptanol, 2-methyl-1-hexanol, 2-methyl-1-hexanol, 2-methyl-2-hexanol, 2-methyl-3-hexanol, 5-methyl-2-hexanol, 3-ethyl-3-pentanol, 2,2-dimethyl-3-pentanol, 2,3-dimethyl-3-pentanol, 2,4-dimethyl-3-pentanol, 4,4-dimethyl-2-pentanol, 3-methyl-1-hexanol, 4-methyl-1-hexanol, 5-methyl-1-hexanol, and 2-ethylpentanol; octanol, such as 1-octanol, 2-octanol, 3-octanol, 4-methyl-3-heptanol, 6-methyl-2-heptanol, 2-ethyl-1-hexanol, 2-propyl-1-pentanol, 2,4,4-trimethyl-1-pentanol, 3,5-dimethyl-1-hexanol, 2-methyl-1-heptanol, and 2,2-dimethyl-1-hexanol; nonanol, such as 1-nonanol, 2-nonanol, 3,5,5-trimethyl-1-hexanol, 2,6-dimethyl-4-heptanol, 3-ethyl-2,2-dimethyl-3-pentanol, and 5-methyloctanol; decanol, such as 1-decanol, 2-decanol, 4-decanol, 3,7-dimethyl-1-octanol, and 2,4,6-trimethylheptanol; undecanol; dodecanol; tridecanol; tetradecanol; pentadecanol; hexadecanol; ~~heptadecanol~~; ~~hexadecanol~~; heptadecanol; octadecanol, such as stearyl alcohol; nonadecanol; eicosanol; heneicosanol; tricosanol; and tetracosanol. --

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-- Examples of the saturated or unsaturated aliphatic ethers may include C1-C40 saturated or unsaturated aliphatic ethers, such as dimethyl ether, diethyl ether, di-n-propyl ether, diisopropyl ether, dibutyl ether, diisobutyl ether, di-n-amyl ether, ~~dihexyl-ether~~, dihexyl ether, diheptyl ether, dioctyl ether, dinonyl ether, didecyl ether, diundecyl ether, didodecyl ether, ditridecyl ether, ditetradecyl ether, dipentadecyl ether, dihexadecyl ether, diheptadecyl ether, dioctadecyl ether, dinonadecyl ether, diicosyl ether, methylethyl ether, methyl-n-propyl ether, methylisopropyl ether, methylisobutyl ether, methyl-tert-butyl ether, methyl-n-amyl ether, methylisoamyl ether, ethyl-n-propyl ether, ethylisopropyl ether, ~~ethylisobutyl-ether~~, ethylisobutyl ether, ethyl-tert-butyl ether, ethyl-n-amyl ether, ethylisoamyl ether, divinyl ether, diallyl ether, methylvinyl ether, methylallyl ether, ethylvinyl ether, and ethylallyl ether. These saturated or unsaturated aliphatic group may either be straight or branched, and the position of an unsaturated bond may be arbitrary. --

Please replace the paragraph beginning on page 42, line 22, with the following rewritten paragraph:

-- The carbonates are oxygen-containing organic compounds having one or more carbonate bonds, and may be carbonates having a saturated or unsaturated C1-C40 aliphatic group, a carbocyclic ring, a carbocyclic ring having a saturated or unsaturated aliphatic group, or a saturated or unsaturated aliphatic group having a carbocyclic ring, such as dimethyl carbonate, diethyl carbonate, di-n-propyl carbonate, ~~diisopropyl-carbonate~~, diisopropyl carbonate, di-n-butyl carbonate, diisobutyl carbonate, di-tert-butyl carbonate, dipentyl carbonate, dihexyl carbonate, diheptyl carbonate, dioctyl carbonate, dinonyl carbonate, didecyl carbonate, diundecyl carbonate, didodecyl carbonate, ditridecyl carbonate, ditetradecyl carbonate, dipentadecyl carbonate, dihexadecyl carbonate, diheptadecyl carbonate, dioctadecyl carbonate, or diphenyl carbonate. These compounds may have a straight or branched, saturated or unsaturated aliphatic group, the position of an unsaturated bond is arbitrary, and the position and number of substitution are arbitrary. --

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Please replace the paragraph beginning on page 49, line 16, with the following rewritten paragraph:

-- Among these nitrogen compounds, aliphatic amines having straight or branched C10-C20 alkyl or alkenyl groups, straight or branched alkyl amines, and (alkyl or alkenyl group may be straight or branched alkenylamines chain, such as decylamine, dodecylamine, tridecylamine, heptadecylamine, octadecylamine, oleylamine, and stearylamine, are preferred. --

Please replace the paragraph beginning on page 52, line 1, with the following rewritten paragraph:

-- The alkylene oxide addition products may be compounds obtained by addition reaction of alkylene oxide to a nitrogen atom in the various amine compounds mentioned above. Examples of the alkylene oxide addition products may include N,N-dipolyoxyalkylene-N-alkyl- or alkenylamine obtained by addition reaction of alkylene oxide to a primary monoamine having a C6-C28 alkythane alkyl or alkenyl group, more specifically, N,N-dipolyoxyethylene-N-oleylamine. --

Please replace the paragraph beginning on page 53, line 25, with the following rewritten paragraph:

-- The molecular weight of the viscosity index improver should be selected in the light of shear stability. Specific examples of the number average molecular weight of the viscosity index improver may be usually 5000 to 1000000, preferably 100000 to 800000 for the dispersant or non-dispersant type polymethacrylate; and usually 800 to 5000 for polyisobutylene or hydrides thereof; and usually 800 to 300000, preferably 10000 to 200000 for ethylene- α -olefin copolymers and hydrides thereof. One or a combination of a plurality of kinds of the viscosity index improvers may be used, and a preferred content is usually 0.1 to 40.0 wt mass% of the total amount of the lubricant.

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Please replace the paragraph beginning on page 55, line 2, with the following rewritten paragraph:

-- In the lubricant of the present invention, the content of the anti-wear agent and/or the extreme pressure agent, if any, is not particularly limited, and is usually 0.1 to 5 wt mass% of the total amount of the lubricant. In particular, when the phosphorus anti-wear agent is used, the content thereof is not particularly limited, and is usually 0.01 to 0.1 wt mass%, preferably not more than 0.08 wt mass%, more preferably not more than 0.06 wt mass% of the total amount of the composition in terms of phosphorus elements. When the sulfur-containing anti-wear agent is used, the content thereof is not particularly limited, and is preferably not more than 0.15 wt mass%, more preferably not more than 0.1 wt mass%, most preferably not more than 0.05 wt mass% of the total amount of the lubricant in terms of sulfur elements. It is particularly preferred that the sulfur-containing anti-wear agent is not contained. --

Please replace the paragraph beginning on page 56, line 3, with the following rewritten paragraph:

-- The content of the ashless dispersant, if any, is not particularly limited, and is usually 0.1 to 15 wt mass% of the total amount of the lubricant. --

Please replace the paragraph beginning on page 56, line 11, with the following rewritten paragraph:

-- The content of the anti-oxidant, if any, in the lubricant of the present invention is not particularly limited, and is usually 0.01 to 3 wt mass% of the total amount of the lubricant. --

Please replace the paragraph beginning on page 56, line 14, with the following rewritten paragraph:

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-- When the anti-oxidant is contained in the lubricant of the present invention, the anti-oxidant may preferably be a molybdenum-based anti-oxidant, such as molybdenum dithiocarbamate, molybdenum dithiophosphate, a molybdenum-amine complex, or a molybdenum-succinimide complex, in particular, molybdenum dithiocarbamate. The content of the molybdenum-based anti-oxidant may be 0.001 to 0.1 wt mass%, preferably not more than 0.03 wt mass%, more preferably not more than 0.02 wt mass% of the total amount of the lubricant in terms of molybdenum elements. --

Please replace the paragraph beginning on page 57, line 8, with the following rewritten paragraph:

-- In the lubricant of the present invention, the content of the rust inhibitor and/or demulsifier, if any, is not particularly limited, and is usually 0.01 to 5 wt mass% of the total amount of the lubricant. The content of the metal deactivator, if any, is not particularly limited, and may suitably be selected from the range of usually 0.0005 to 1 wt mass% of the total amount of the lubricant. --

Please replace the paragraph beginning on page 70, line 23, with the following rewritten paragraph:

-- When the DLC-coated shim and the lubricant composition of Example 3-2 containing a sulfur-free phosphorus compound were used, an extremely superior friction torque reduction rate was achieved, i.e. about 19 % under high temperature, low revolution conditions, and about 8 % under low temperature, high revolution conditions, compared to the friction torque achieved with the ordinary steel shim and the lubricant of Comparative Example 1.

Examples 4-1 to 4-2 and Comparative Example 4-1

(Preparation of Lubricant Composition) --